

Investigation of Respiratory Outcomes in the Agricultural Health Study

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Background: Farmers and their families are at higher risk of adverse respiratory outcomes; however, few studies can explore current risk factors in addition to established risk factors, such as grains and animals.

Methods: The Agricultural Health Study, a prospective cohort study of licensed pesticide applicators and their spouses in Iowa and North Carolina, provides the opportunity to assess a variety of determinants of respiratory outcomes. Over 52,000 private applicators (farmers), 5,000 commercial applicators, and 32,000 spouses of the private applicators enrolled from 1993–1997. Participants provided information on agricultural exposures including lifetime pesticide use, crop and animal production, and farm maintenance.

Results: The prevalence of respiratory disease was similar to national estimates (asthma 5%, chronic bronchitis 4%). Wheeze among applicators was higher than the general population (19% among farmers, 22% among commercial applicators), even though smoking rates were lower. We assessed pesticides associated with wheeze using logistic regression models controlling for age, state, and smoking. In both groups, we observed strong evidence of organophosphates with wheeze. For farmers, chlorpyrifos, malathion, and parathion were positively associated with wheeze; for the commercial applicators, chlorpyrifos, dichlorvos, and phorate were positively associated. Chlorpyrifos was associated with wheeze in a dose-dependent manner; use of chlorpyrifos for 19 or more days/year had an odds ratio of 1.48 (95% Confidence Interval (CI) = 1.00, 2.19) for farmers and 1.96 (95% CI = 1.05, 3.66) for commercial applicators. The herbicide chlorimuron ethyl was also associated with wheeze.

Conclusions: We are currently analyzing the factors associated with prevalent respiratory disease, taking advantage of the diversity of exposures between the two states and between farm men and women. The Agricultural Health Study provides a unique opportunity to uncover links between exposures and respiratory disease and to understand mechanisms.

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